Tax-Favored Financing for Renewable Energy Resources and Energy Efficiency

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Summary

Tax policy is one tool available to promote the use of domestic renewable energy resources. Tax-subsidized financing, specifically tax-favored bonds, reduce the cost associated with making oftentimes capital intensive investments in renewables and energy efficiency. This report provides an overview of the various federally tax-favored financing options available for renewable energy and energy-efficiency investments. This report also highlights the economic foundations for subsidizing renewable energy investment and comments on economic issues specific to tax-favored financing.

Various forms of federally tax-favored bonds have been used to subsidize investments in renewables and efficiency. Some of these bonds, such as the Clean Renewable Energy Bonds (CREBs) and Qualified Energy Conservation Bonds (QECBs), are tax-credit bonds available only for investments in renewables or efficiency. CREBs alone have been used to finance 1,727 renewable energy projects, through $3.4 billion in CREB allocations. Other types of tax-favored bonds, such as tax-exempt governmental bonds or private activity bonds and Build America Bonds (BABs), are more widely available but have been used for energy-related projects. More than $10 billion worth of BABs have been issued to finance electric and public power projects (although it is not clear what share of this issue is dedicated to renewables).

The magnitude of the subsidy afforded by the different types of federally tax-favored financing differs from both the perspective of the bond issuer and the investor. An example, where a hypothetical CREB, BAB, and tax-exempt bond is used to finance the same project, illustrates how policymakers can adjust bond terms to manipulate the subsidy provided to issuers and investors.

Tax incentives promote investment in renewables and energy efficiency by reducing the cost of such investments relative to fossil energy alternatives. Investments in renewable energy generation capacity, especially wind, have led to an increasing share of renewables in the nation's overall energy portfolio. Subsidizing investments in renewables using tax policy, however, may not be the most *economically* efficient mechanism for increasing the use of renewable energy and promoting energy efficiency. Subsidizing renewables through tax incentives leads to federal revenue losses, requiring that federal revenues be raised by some other, potentially distortionary, form of taxation.

Tax-exempt bonds may not be the best tool for subsidizing investment in renewables when evaluated in terms of economic efficiency and equity. With tax-exempt bonds, federal revenue losses may exceed the subsidy provided to issuers, and thus be an inefficient subsidy. Tax-exempt bonds also provide a larger subsidy to taxpayers in higher tax brackets, raising equity concerns. Tax-credit bonds, as an alternative, represent a tax-subsidization option that is not subject to the inefficiencies and inequities associated with tax-exempt debt.

While tax-subsidized financing has been a popular tool in recent years for promoting investment in renewables and efficiency, a number of these bonds are not currently available as options for project investors. Specifically, all available CREB financing has been allocated, and projects were unable to issue BABs after December 31, 2010. Whether these programs have successfully promoted renewable energy investment, and should be extended, may be an issue the 112th Congress will want to consider.

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Introduction

Domestic energy policy has historically been, and continues to be, motivated by two goals. First, U.S. energy policy has sought to promote domestic energy security. Uncertainty surrounding energy prices and imports generates interest in further developing domestic energy-generation capacity. With respect to energy security, the concern is greatest in the transportation sector, where 94% of the sector is powered using petroleum.[1] Renewable energy resources have the potential to play an important role in developing domestic generation capability.[2] Second, U.S. energy policy is driven by a desire to address environmental concerns. One environmental goal is the reduction of greenhouse gas (GHG) emissions. Approximately 48% of electric power in the U.S. is produced using coal.[3] Producing electricity and fuels using renewable energy technologies offers the possibility of production with low GHG emissions.[4]

Despite energy policy objectives, growth in renewable energy production has been slow. **Figure 1** illustrates domestic energy production by source over the past 50 years. In 1949, nearly 32 quadrillion btus of energy were produced. More than 9% of the energy produced was from a renewable energy source (4.5% from hydro electric power and 4.8% from biomass). By 2009, energy production had more than doubled to 73 quadrillion btus. In 2009, 10.6% of energy production came from a renewable source (3.7% from hydro electric power, 5.3% from biomass, with less than 1% coming from wind, geothermal, or solar sources).[5]

More recent evidence, however, suggests that the use of renewables is growing and overall energy consumption is decreasing. For example, in 2009, 39% of all new electric generating capacity installed was wind power.[6] This new capacity was the result of $21 billion in investment. Overall, wind power's share in domestic energy production increased by 28%. Despite this increase, wind power accounts for less than 1% of domestic energy production. In 2008, wind power was 0.73% of domestic energy production, increasing to 0.96% in 2009.[7]

While domestic energy production (**Figure 1**) has continued to increase in recent years, domestic energy consumption has declined. In 2009, domestic energy consumption was less than 95 quadrillion btus, down from 99 quadrillion btus in 2008.[8] Renewables, as a share of energy

[1] Energy Information Administration (EIA), Annual Energy Review, U.S. Primary Energy Flow by Source, 2009. Available at http://www.eia.doe.gov/aer/pecss_diagram.html.

[2] Renewable energy can be defined as a natural energy source that is not limited in supply. Renewable resources that can be used for electricity production include wind, solar, geothermal, and biomass. Renewable resources that can be used for fuel include ethanol, biodiesel, and biomass.

[3] Energy Information Administration (EIA), Annual Energy Review, U.S. Primary Energy Flow by Source, 2009. Available at http://www.eia.doe.gov/aer/pecss_diagram.html.

[4] Complementary to these two goals is the notion that transforming U.S. energy production and consumption patterns will require substantial resources and potentially create a number of "green" jobs. For background information on green jobs, see CRS Report R40833, *Renewable Energy—A Pathway to Green Jobs?* by Richard J. Campbell and Linda Levine.

[5] CRS calculations using data from Energy Information Administration (EIA), *Annual Energy Review 2009*, Table 1.2.

[6] Ryan Wiser and Mark Bolinger, *2009 Wind Technologies Market Report*, U.S. Department of Energy / Lawrence Berkeley National Laboratory, LBNL-3716E, August 2010, http://eetd.lbl.gov/ea/ems/reports/lbnl-3716e.pdf.

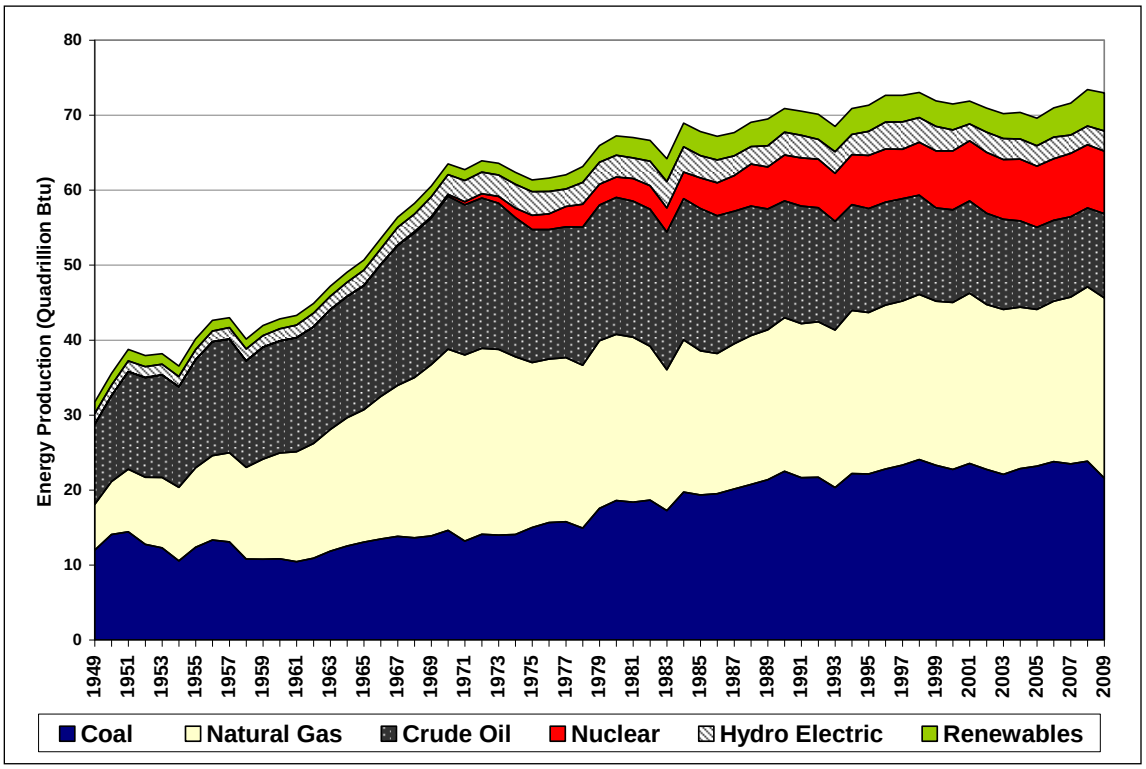
[7] These data, from the Energy Information Administration (EIA), *Annual Energy Review 2009*, Table 1.2., were used to generate **Figure 1**.

[8] U.S. Energy Information Administration, *Annual Energy Review 2009*, DOE/EIA-0384, August 19, 2010, Table 1.3, http://www.eia.doe.gov/emeu/aer/overview.html.

consumption, were 7.4% in 2008 and 8.2% in 2009.[9] The increased share of domestic energy consumption from renewable sources is partially due to increased production from these sources. The overall decline in energy consumption from all sources, however, also increased the renewables' relative share.[10]

Figure 1. Energy Production by Source

1949 - 2009



Source: CRS graphic using data from the Energy Information Administration (EIA), *Annual Energy Review 2009*, Table 1.2.

Notes: Natural gas includes natural gas plant liquids.

There are several federal policies that could potentially increase energy production from renewables. One option is to establish a national renewable portfolio standard (RPS), which would require that a certain share of energy supplied come from renewable sources.[11] A number of states have an RPS in place.[12] Legislative proposals to establish a federal RPS date back to at

[9] The decline in overall energy consumption in 2009 may be partially explained by the weak economy. Despite the decline in overall energy consumption, the share of renewables increased.

[10] The decline in energy consumption may be due to a number of factors. First, enhanced use of energy-efficient technologies may be contributing to the reduction in energy consumption. Energy consumption first began to decline after 2007, suggesting that the decline may have also been a consequence of the financial crisis. Determining the causes of the recent decline in energy consumption is beyond the scope of this report.

[11] For background, see CRS Report R41493, *Options for a Federal Renewable Electricity Standard*, by Richard J. Campbell and CRS Report RL34116, *Renewable Energy Portfolio Standard (RPS): Background and Debate Over a National Requirement*, by Fred Sissine.

[12] For a summary of state level RPSs, see http://apps1.eere.energy.gov/states/maps/renewable_portfolio_states.cfm.

least the 105th Congress.[13] Legislation introduced during the 111th Congress, if enacted, would have required that 25% of energy be generated using renewable resources by 2025.[14] Proposals in the 110th Congress sought to enact an RPS of 15% by 2020. While Congress continues to explore the possibility of a federal RPS through various hearings, it does not appear that adoption of such a standard is imminent.[15]

While adoption of a federal RPS does not appear likely in the near future, strong interest remains in increasing the use of renewables and in increasing investments in energy efficiency. Current policies, including tax incentives, loan guarantees, and federal grants, have promoted renewables and energy efficiency in the past, and are expected to play an important role in shaping future energy policy. Current policies recognize the important role private capital plays in renewable energy investments, and seek to mobilize and attract such capital to renewables and energy efficiency projects.

Promotion of both renewables and energy efficiency is consistent with the long-standing energy policy goals of enhancing domestic energy security while simultaneously addressing ongoing concerns regarding the environment. As such, it is expected that Congress will continue to look for ways to encourage these investments. Understanding how to best encourage investments in renewable energy involves understanding what has been done in the past, evaluating the success of these initiatives, and evaluating whether previous initiatives should play a role in future energy policy.

This report focuses specifically on federally subsidized or supported debt designed to promote investment in renewables and energy efficiency. These instruments have played an important role in the renewable energy financing landscape in recent years. Understanding what types of debt instruments currently are and previously have been available, the degree of federal subsidization contained within these instruments, and what types of investments have resulted from these programs, will help policymakers evaluate if and how these tools can be used in the future to promote renewables and efficiency.

Economic Framework

An economic justification for government intervention in energy markets is to address market failures arising due to externalities. These externalities may lead to over consumption of some energy sources generating a loss in *economic* efficiency. Government policy, in particular tax policy, may be capable of guiding the market toward a more economically efficient allocation of resources by internalizing the externalities.[16]

Both the production and consumption of energy may be associated with negative externalities.[17] For example, burning fossil fuels contributes to air pollution and generates greenhouse gasses,

[13] CRS Report RL34116, *Renewable Energy Portfolio Standard (RPS): Background and Debate Over a National Requirement*, by Fred Sissine.

[14] See S. 433 and S. 826.

[15] U.S. Congress, Senate Committee on Energy and Natural Resources, *Receive Testimony on a Majority Staff Draft for a Renewable Electricity Standard Proposal*, 111th Cong., February 10, 2009.

[16] For an extended discussion of market failures in energy markets, see CRS Report R40999, *Energy Tax Policy: Issues in the 111th Congress*, by Molly F. Sherlock and Donald J. Marples.

[17] An externality is a spillover from an economic transaction to a third party, one not directly involved in the transaction itself. When externalities are present, markets fail to establish energy prices equal to the social marginal cost of supply. The result is a system where cost and/or price signals are inaccurate, such that the socially optimal level of output, or allocative efficiency, is not achieved. Imposing a tax (subsidy) equal to the value of costs (benefits)

both widely considered negative externalities. Imposing a tax on the polluting activity can improve economic efficiency by forcing polluters to face the total costs associated with polluting activities.[18]

Fossil fuels used to produce energy, specifically traditional coal and crude oil, generate environmental costs that are not directly borne by either the energy producer or the energy consumer. Because producers and consumers do not bear the full cost of fossil fuel energy production, the market outcome results in more energy from fossil fuels being produced than would have been the case if environmental costs were taken into account. Imposing a tax on (or regulating) polluting activities would increase the cost associated with such activities, and ultimately decrease the quantity of the polluting activity. In theory, if the tax is equal to the external social costs not previously considered, the tax will guide the market to a more economically efficient allocation of resources.

While taxes or similar instruments are the most economically efficient mechanisms for addressing market failures stemming from negative externalities, an alternative policy option is to subsidize a non-externality-generating alternative. In other words, instead of increasing the cost of fossil fuel sources, decrease the cost of renewable sources. Energy tax policy in the United States has tended toward this alternative approach, providing a number of tax credits and other tax preferences for investments in renewables and energy efficiency. By making renewables cheaper relative to traditional energy sources, investment in renewable alternatives is expected to increase.

Critics of tax preferences for renewables and efficiency, however, maintain that preferences are not likely to be economically efficient for a number of reasons. They note that first, tax subsidies reduce government revenues, while taxes that correct for negative externalities increase government revenues. Tax subsidies for renewables, therefore, can require the government to raise taxes by taxing other activities, such as labor, through an income tax. Second, tax subsidies may distort investments, directing resources toward technologies that may not be the most cost-effective mechanism for greenhouse gas emissions reduction or for achieving other goals, such as job creation. Supporters of setting a price on greenhouse gas emissions assert that it would allow the market to select the most cost-effective alternatives. With tax subsidies, the government is choosing the preferred technology, and may "pick winners" rather than allowing the market to identify the most cost-effective energy resources.[19] Finally, they note that tax subsidies for renewable energy reduce the average cost of energy resources. As the average cost of energy falls, the quantity of energy demanded from all energy sources, including non-renewable sources, increases. Thus, while subsidizing renewables increases investment in renewables by reducing their cost relative to non-renewable alternatives, a possible unintended consequence of such incentives could be additional fossil fuel consumption resulting from reduced energy costs broadly. Overall, it seems likely that tax incentives for renewables will increase investment in renewables, but that some of those gains may be reduced by increased fossil energy consumption resulting from reduced energy prices.[20]

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associated with the externality enhances economic efficiency.

[18] Regulatory approaches can also be used to control the amount of pollution.

[19] Evidence suggesting that existing energy tax preferences are not neutral across technologies, and are not economically efficient, is discussed in Congressional Budget Office, *Federal Climate Change Programs: Funding History and Policy Issues*, Washington, DC, March 2010 and U.S. Congress, Senate Committee on Finance, *Technology Neutrality in Energy Tax: Issues and Options*, Statement of Gilbert E. Metcalf, Tufts University, 111th Cong., 2nd sess., April 23, 2009.

[20] The same phenomenon is observed in the market for energy efficiency, where the gains from energy efficiency are oftentimes observed to be partially offset through increased use of energy-efficient products. This phenomenon is often referred to as the "rebound effect."

Investments in energy projects are generally capital intensive. One method for promoting renewables investments is through tax incentives that reduce a project's cost. Historically, tax incentives have been available for the investment in and production of renewable energy. As noted above, U.S. energy tax policy has tended to use the tax code to subsidize certain energy resources as a mechanism for achieving energy policy goals.

Federally Tax-Favored Financing

Federally subsidized financing offers an alternative to direct tax incentives for renewable energy and energy efficiency projects. Subsidized financing reduces the cost of capital, making these capital-intensive investments more attractive. In recent years, various forms of federally subsidized financing have been available to promote investments in renewable energy and energy efficiency. The following sections provide an overview and analysis of federally subsidized financing programs for renewables and efficiency.

Tax-Exempt Bonds

Tax-exempt bonds (also referred to as municipal bonds) are the primary tool state and local governments use to finance the construction of public capital projects. States, cities, counties, state and local authorities, special districts, and tribal governments all issue tax-exempt bonds to finance public capital projects. In 2009, $323.7 billion of tax-exempt bonds were issued and over $2.8 trillion of municipal bonds were outstanding (though a portion of those outstanding bonds are taxable).[21] State authorities were the largest single annual issuer of municipal bonds (mostly tax-exempt) based on dollar amount, at just over $120.3 billion in 2009.

The Tax Subsidy

The federal government provides a tax subsidy for tax-exempt bonds for both issuers and investors. The interest costs of issuers are lower because the interest payments are exempt from income taxes. The tax-free interest payments allow the issuer to offer lower interest payments to investors. For example, in October 2010, the average interest rate on high quality tax-exempt bonds was 3.87% and for taxable corporate bonds of similar maturity and quality, the rate was 4.68%.[22]

High-income investors, those in the top income tax brackets, receive a rate of return on their tax-exempt bond investments that exceeds that of any other investment of similar risk profile. Consider a 35% marginal tax rate investor who purchases a 4.0% tax-exempt bond with principal of $1,000 that is to be repaid after 20 years. Each year for 20 years this taxpayer receives $40 in tax-exempt interest income. If the investor had purchased a taxable bond carrying a 5% interest rate, he would have received $50 in interest income while paying $17.50 in income taxes on that income. Each year the federal government forgoes collecting $17.50 of revenue from the tax-exempt bond because the revenue loss is based upon the interest earnings the taxpayer forgoes

[21] Thomson Reuters, "The Bond Buyer 2010 Yearbook," SourceMedia Inc., New York, NY, p. 7.

[22] Board of Governors, Federal Reserve Bank, Table H. 15, *Selected Interest Rates,* available at http://www.federalreserve.gov/releases/h15/current/h15.htm, visited November 22, 2010. Note that tax-exempt bonds and corporate bonds are not typically structured identically. There are some provisions that are common for tax-exempt bonds, such as a 10-year call provision, that most corporate bonds do not have.

and the income taxes that would have been generated.[23] In this example, the after-tax rate of return is $40 for the tax-exempt bond and $32.50 for the taxable bond.

The average interest rates alluded to above mask in part the significant variation in bond yields across jurisdictions and by project financed. Less credit worthy jurisdictions and riskier projects carry above-market interest rates. The amount of the federal subsidy rises with the interest rate.

There are two types of tax-exempt bonds. In addition to bonds issued to finance projects related to governmental service, Congress has extended the authority to issue tax-exempt bonds to selected projects whose benefits are more private in nature. The tax code identifies this second type of bond as a "qualified private activity bond." Market participants and issuers refer to these two broad categories of tax-exempt bonds as governmental bonds and private activity bonds (PABs).

The following two sections briefly describe the two types of tax-exempt bonds, highlighting the associated tax benefits. In addition, background on how the bonds are used to finance energy production infrastructure is provided.

Governmental

Governmental bonds are used to finance government projects (e.g., building a courthouse) or are secured with generally applicable taxes (e.g., a sales tax). The most common type of governmental bond is the general obligation bond (GO) where the full faith and credit of the issuing entity backs the bond. General obligation bonds carry the least risk for investors. Another type of governmental bond is a revenue bond where a specific stream of government revenue, such as a sales tax, is used to secure repayment of the bond.

Many governments own and operate utilities that generate electricity. These governmental projects are oftentimes financed with tax-exempt bonds. In 2009, $12.1 billion of tax-exempt debt was issued for government-owned electric power production facilities. The interest rate spread between taxable corporate bonds and tax-exempt bonds was 69 basis points (5.31% for corporate bonds less 4.62% for tax-exempt bonds). A rough estimate of the annual federal subsidy to the issuer of tax-exempt bonds for energy production in 2009 would be $83.4 million.[24] Note, however, that the federal subsidy is different from the loss in tax revenue. Investors avoid paying taxes on what would have otherwise been a taxable investment. With most tax-exempt bonds, the lost tax revenue exceeds the subsidy to the issuer.

The use of governmental bonds for energy production is available for energy production from all sources including renewables and traditional fossil fuels. Policy makers may choose to assess the role of governmental bonds for energy production and the alignment of tax policy with energy policy.

Private Activity Bonds[25]

Congress has authorized the use of tax-exempt private activity bonds to finance projects that are not typically governmental. A private activity bond is one that primarily benefits or is used by a

[23] The decision about preferred alternatives is critical to estimates of the revenue loss from tax-exempt bonds. An entire range of financial and real assets exists with different yields, risk, and degree of preferential taxation. It is not true that the municipal bond purchaser's preferred alternative is always a taxable bond.

[24] This estimate is intended to provide a sense of scale of the subsidy conferred through tax-exempt debt. The 69 basis points (0.69%) of the total issuance would account for the federal subsidy.

[25] For additional background information, see CRS Report RL31457, *Private Activity Bonds: An Introduction*, by

private entity. The tax code defines *private business (or private entity) use* as "use (directly or indirectly) in a trade or business carried on by any person other than a governmental unit. For purposes of the preceding sentence, use as a member of the general public shall not be taken into account."[26] Two conditions or tests are used to assess the status of a bond issue with regard to the private entity test. Satisfying both conditions would mean the bonds are taxable private activity bonds. Bonds are *private activity bonds* and *not* tax-exempt if both of the following conditions are met:[27]

- [use test] more than 10% of the proceeds of the issue are to be used for any *private business use*,... [and]
- [security test] if the payment on the principal of, or the interest on, more than 10% of the proceeds of such issue is (under the terms of such issue or any underlying arrangement) directly or indirectly secured by any interest in:
  - (1) property used or to be used for a private business use, or
  - (2) payments in respect to such property. Or [if the payment is] to be derived from payments (whether or not to the issuer) in respect of property, or borrowed money, used or to be used for a private business use.

If a bond issue passes both tests, the bonds are taxable and would carry a higher interest rate.[28] Nevertheless, bond issues that pass both tests can still qualify for tax-exempt financing if they are identified in the tax code as *qualified* private activities. Thus, when those in the bond community refer to tax-exempt private activity bonds, the more technically correct reference is tax-exempt, *qualified* private activity bonds.

There is also a private loan financing test. Under this test, a bond is *not* tax-exempt if more than the lesser of 5% or $5 million of the proceeds of the issue is to be used directly or indirectly to make or finance loans to persons other than governmental persons.[29] For example, an issuer could not use the proceeds from a tax-exempt bond to loan money to small businesses for energy efficiency improvements.[30]

Qualified private activity bonds can be issued for privately operated "local electric energy or gas furnishing facilities."[31] Financing the construction of energy production facilities, however, with qualified private activity bonds is not common as governmental bonds can be used for such projects. In addition, the restrictions for bonds authorized under this section are intended to prevent the financing of new production facilities with qualified private activity bonds just supporting existing facilities.

Steven Maguire.

[26] 26 U.S.C. 141(b)(6)(A)

[27] 26 U.S.C. 141(b)

[28] The "premium" for the tax-exempt private activity bond has been estimated to be roughly 50 basis points or 0.50%.

[29] 26 U.S.C. 141(c).

[30] The tax code does allow some loan programs to be financed with tax-exempt bonds such as mortgage bonds. These special cases are described in more detail later in the report.

[31] 26 U.S.C. 142(f).

Tax Credit Bonds[32]

Tax credit bonds generally entitle the bondholder to a federal tax credit at a rate determined by the Secretary of the Treasury. Alternatively, an issuer may chose to receive the tax credit in the form of a direct payment from the federal government. The tax credit reduces the net interest payments an issuer is required to pay, or limits the discount at which the bond must be sold, to attract investors.[33] With an investor tax credit, the federal government is providing a return to investors that subsidizes the borrowing. Tax credit bonds that subsidize investments in renewables and energy efficiency, through both the issuer and investor tax credits, are discussed in the following sections.

Clean Renewable Energy Bonds (CREBs)

Clean renewable energy bonds (CREBs) have been made available to tax-exempt entities investing in renewables that are not able to take advantage of other tax incentives.[34] Eligible entities include governmental bodies, cooperatives, and public power utilities. CREBs, as tax credit bonds, reduce the cost of financing for renewable energy projects receiving a CREB allocation.[35] Thus, CREBs provide an incentive for public entities to invest in renewable energy projects and allow tax-exempt entities to better compete with projects able to claim tax credits.

CREBs were first established under the Energy Policy Act of 2005 (EPACT05; 109-58). Under EPACT05, $800 million in CREBs were to be issued between January 1, 2006 and December 31, 2007 (see **Table 1** for details on the initial allocation). The Tax Relief and Health Care Act of 2006 (P.L. 109-423) increased the volume cap on CREBs by $400 million, to a total of $1.2 billion (see "2007 Allocation" column in **Table 1** to see how the additional $400 million was allocated). This act also extended the expiration date for the allocation of the total $1.2 billion through 2008.

Table 1. CREB Applications and Allocations

	2006 Allocation		2007 Allocation		2009 Allocation	
	Projects	Dollars (millions)	Projects	Dollars (millions)	Projects	Dollars (millions)
Government						
Applications	701	$2,000	367	$728	997	$3,068
Approved	532	$500	286	$263	739	$800
Approval Percentage	*76%*	*25%*	*78%*	*36%*	*74%*	*26%*
Cooperative						

[32] For additional background information, see CRS Report R40523, *Tax Credit Bonds: Overview and Analysis*, by Steven Maguire.

[33] Issuing a bond at a discount means the amount paid for the bond is discounted significantly from the face value. For example, an investor may pay $9,000 for a bond with a face value of $10,000. At bond maturity, the investor would receive $10,000 from the issuer, $1,000 more than what was paid for the bond ($10,000 less $9,000).

[34] CREBs are available to finance qualified energy production projects which include (1) wind facilities, (2) closed-loop biomass facilities, (3) open-loop biomass facilities, (4) geothermal or solar energy facilities, (5) small irrigation power facilities, (6) landfill gas facilities, (7) trash combustion facilities, (8) refined coal production facilities, and (9) certain hydropower facilities.

[35] For background information, see CRS Report R40523, *Tax Credit Bonds: Overview and Analysis*, by Steven Maguire.

	2006 Allocation		2007 Allocation		2009 Allocation	
	Projects	Dollars (millions)	Projects	Dollars (millions)	Projects	Dollars (millions)
Applications	85	$554	28	$170	31	$609
Approved	78	$300	26	$143	31	$609
Approval Percentage	*92%*	*54%*	*93%*	*84%*	*100%*	*100%*
Public Power						
Applications					38	$1,446
Approved					35	$800
Approval Percentage					*92%*	*55%*
Total						
Applications	786	$2,554	395	$898	1028	$5,123
Approved	610	$800	312	$405	805	$2,209
Approval Percentage	*78%*	*31%*	*79%*	*45%*	*78%*	*43%*

Source: Internal Revenue Service.

Notes: Columns may not sum due to rounding. The 2007 allocation is more than the $400 million approved as funds not spent in 2006 allocation were reallocated for newly approved projects.

The federal government subsidized the borrowing costs for entities issuing CREBs by providing tax credits to bondholders. Since bondholders are receiving tax credits from the federal government, the issuing entity can borrow while paying little or no interest on the debt. Theoretically, the Treasury was to set the credit rate such that the CREB issuer would not need to issue the bond at a discount or pay interest payments.[36] The Treasury used market rates based on AA-rated corporate bonds. A number of municipalities issuing CREBs had credit ratings lower than AA. Thus, these issuers had to sell the bonds at a discount or pay supplemental interest to attract investors.[37]

The data in **Table 1** show that in the first allocation of CREBs, 78% of projects were approved, representing 31% of the total authority requested. This data reflects the IRS selection process, whereby projects are selected using a smallest-to-largest approach. There are no state volume caps or state limits, as is typically the case for tax-exempt bonds. Under the second round of CREB allocations, 79% of applications were approved allowing 45% of the total CREB authority requested to be issued.

The Emergency Economic Stabilization Act (EESA; P.L. 110-343) authorized $800 million in "New CREBs." As authorized in the American Recovery and Reinvestment Act (ARRA, P.L. 111-5), the *new* CREBs have a national limit of $2.4 billion to be issued before December 31, 2009. The $2.4 billion was to be allocated in equal shares to government entities, cooperatives, and public power providers. All of this $2.4 billion had been allocated to projects by the end of

[36] Tax credit bond rates can be found on the Treasury's website, at https://www.treasurydirect.gov/govt/rates/irs/rates_irstcb.htm.

[37] Claire Kreycik and Jason Croughlin, *Financing Public Sector Projects with Clean Renewable Energy Bonds (CREBs)*, National Renewable Energy Laboratory, Fact Sheet Series on Financing Renewable Energy Projects, December 2009.

2009 (see **Table 1** for allocation details). Currently, the IRS is not accepting applications for CREB allocations as no funds are available.[38]

While the allocations for government entities and cooperatives were allocated using the previously employed smallest-to-largest methodology, CREBs for public power providers (municipal utilities) were awarded on a pro-rata basis to all eligible projects. In other words, each eligible project was allocated a portion of the $800 million based on the fraction of the project's total request relative to the total CREB volume requested by all public power projects.

New CREBs differ from the traditional CREBs in a number of ways. First, the tax credit rate for new CREBs is 70% of the rate determined by the Treasury as being required for issuers to pay zero interest. With this lower credit rate it is expected that issuers will be required to make supplemental interest payments. Second, the Treasury determines the tax credit rate for new CREBs by looking at the yield on "single A" or BBB bonds. Using a lower investment grade to determine the credit rate reduces the amount of supplemental interest issuers will be required to pay. Third, issuers of new CREBs can pay the entire principal at the bond's maturity. This provides renewable energy projects with additional capital in the early years, when projects are most likely to be capital constrained. Fourth, in the 111th Congress, P.L. 111-147 expanded the direct issuer payment option (the issuer receives the tax credit in contrast to the investor) to include new CREBs. Finally, investors in new CREBs are allowed to strip the tax credits from the principal payments and sell each separately. This change increased the liquidity of CREBs, making them a more attractive investment.

The high demand for financing investment under the original CREB mechanism continued under new CREBs despite the lower 70% credit rate. The Treasury had the capacity to approve 78% of all applications under the *original* CREBS. The project application approval rate for *new* CREBs was 43%.

In March 2010, provisions included in the Hiring Incentives to Restore Employment Act (HIRE Act; P.L. 111-147) allowed issuers of CREBs (and other qualified tax-credit bonds) to receive a direct payment from the Treasury instead of providing tax credits to bondholders. Essentially, this transforms CREBs into a refundable tax credit for the issuer, which can be used to subsidize borrowing costs.

As noted above, having fully subscribed all capacity, CREB funding authority is not currently available. Thus, public entities have limited options when it comes to securing low-cost financing for investments in renewables. A variety of tax credits and other incentives are still available for taxable entities investing in renewable energy projects. These incentives are not available for non-taxable entities, putting their projects at somewhat of a financing disadvantage thought they do have access to tax-exempt bond financing. Some non-taxable or public entities have responded by partnering with taxable entities able to take advantage of tax incentives. Not all entities, however, are able to establish such partnerships.

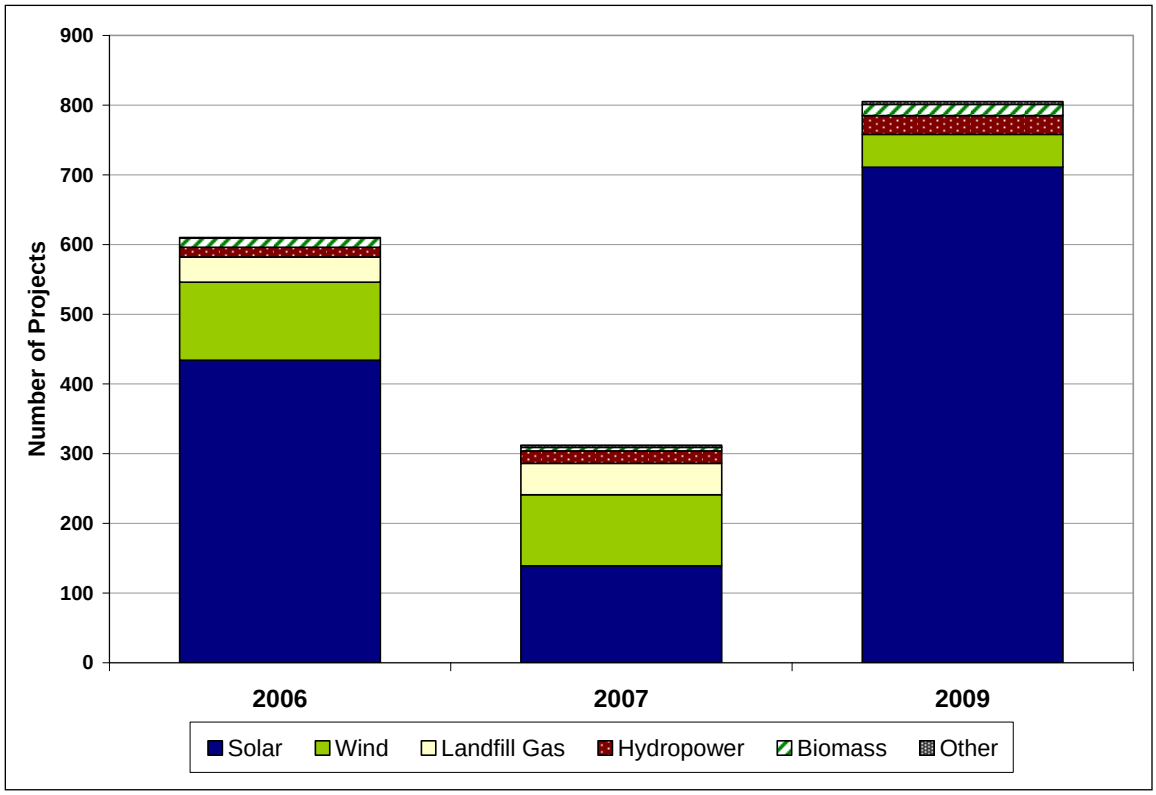
As **Table 1** indicates, CREB financing has been used to finance 1,727 renewable energy projects totaling $3.4 billion. The uncertainty surrounding the possibility of an additional CREB authority may limit renewable energy investment. Public entities wanting to invest in renewable energy projects may be reluctant to do so at this time as CREB financing is not currently an option, but may become an option if additional funding is authorized in the future.

[38] Applications for the $191 million in unallocated CREBs for cooperatives were being accepted through November 1, 2010. The $191 million was available only for cooperatives, as the $800 million allocated to cooperatives during the 2009 allocation was undersubscribed.

Types of Projects Funded with CREBs

Figure 2 presents data on the number of projects financed by technology type. The majority of projects financed using CREBs are solar installations. The second largest category, in terms of number of projects financed, are wind installations. Solar projects, however, tend to be smaller when projects are viewed according to total dollars spent.

Figure 2. CREB-Financed Projects by Technology

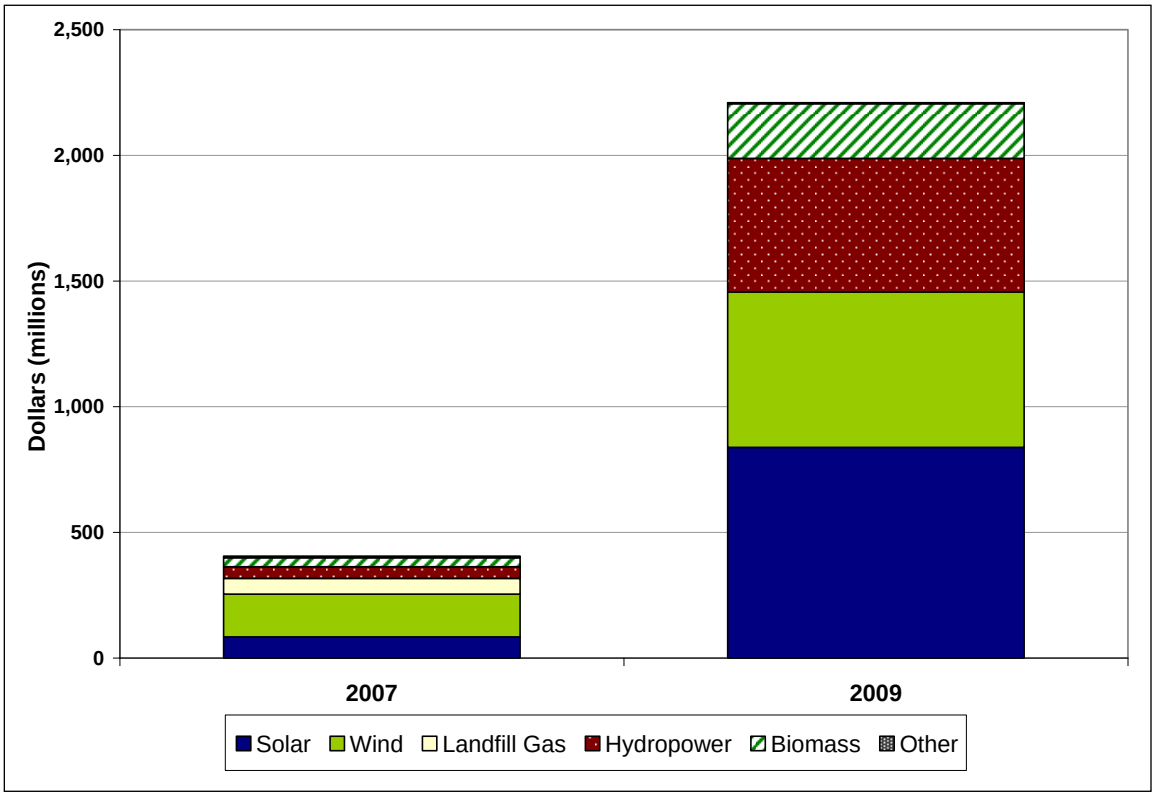


Source: CRS analysis of IRS data.

Notes: Other includes geothermal, trash combustion, and refined coal projects.

Figure 3 presents data on CREB dollars allocated by technology type (data on dollars by technology type is not available for the 2006 allocation). In 2007, approximate 45% of CREB-financed projects were solar, yet solar projects received less than 21% of CREB dollars allocated in 2007. This reflects the fact that solar projects tend to be smaller and less expensive than other renewable installations. In 2009, 88% of projects financed were solar, accounting for approximately 38% of CREB dollar allocations. In 2009, the difference between the share of hydropower projects and hydropower's share of allocated dollars is particularly large. While approximately 3% of CREB financed projects in 2009 were hydropower, these projects received approximately 24% of 2009 CREB dollars.

Figure 3. Dollars Allocated by Technology



Source: CRS analysis of IRS data.

Notes: Other includes geothermal, trash combustion, and refined coal projects. Data on dollars spent by technology type is not available for the 2006 allocation.

Qualified Energy Conservation Bonds (QECBs)

Qualified energy conservation bonds (QECBs) are tax credit bonds that can be issued by state, local, or tribal governments to fund various energy-efficiency projects. Eligible projects include capital expenditures on public buildings intended to increase energy efficiency, financing research projects that investigate increasing energy efficiency, mass commuting projects, demonstration projects, and public education campaigns. Renewable energy production facilities that are eligible for CREBs may also be eligible for QECBs.

The Emergency Economic Stabilization Act of 2008 (EESA; P.L. 110-343) authorized the issue of $800 million in QECBs. The American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5) increased the authorized issuance to $3.2 billion. Like with new CREBs, the tax credit rate is 70% of the market interest rate as calculated by the Treasury. Given this credit rate, QECBs will be issued to investors at a discount or with a supplemental interest payment.

Generally, like most tax credit bonds, the holder of the bond is entitled to a federal tax credit allowing the issuer to make limited interest payments bondholders. Like with CREBs, for QCEBs issued after March 18, 2010, issuers can elect to claim the tax credit directly rather than allowing bond purchasers to claim tax credits.

Unlike CREBs, QECBs are allocated among states in proportion to each state's population.[39] QECB programs are administered by the state energy office in an application's respective state. One perceived advantage of allocating bonds based on population is that the all states would have equal access to the federal subsidy. The disadvantage is that not all states may have the same need for energy-efficiency projects.[40]

Build America Bonds (BABs)

Build America Bonds (BABs) were established under the Recovery Act (ARRA) in 2009 to reduce governmental issuer's borrowing costs. BABs are not targeted in their designation and the volume of BABs is not limited. The purpose is constrained only by the requirement that "the interest on such obligation would (but for this section) be excludible from gross income under section 103."[41] Thus, BABs can be issued for any purpose that would have been eligible for traditional tax-exempt bond financing other than private activity bonds which would include energy production. The bonds must be issued before January 1, 2011.

BAB Mechanics

Unlike other tax exempt bonds, the BAB credit rate is not determined by the Secretary of the Treasury. Instead, the BAB credit amount is 35% of the interest rate established between the buyer and issuer of the bond. The issuer and investor agree on terms either as a result of a competitive bid process or through a negotiated sale. The issuer has the option of (1) receiving a direct payment from the Treasury equal to the credit amount or (2) allowing the investor to claim the credit. Issuers have chosen the direct payment option for all BABs issued to date. A U.S. Treasury Department report on BABs estimated that through March of 2010, the bonds had saved municipal issuers roughly $12 billion in interest costs.[42]

As long as the marginal tax rate that clears the municipal bond market is lower than the current credit rate on BABs of 35%, then municipal issuers would likely choose the BAB option. However, if the market clearing marginal tax rate rises, the alternative to BABs, traditional tax-exempt bonds, would be more attractive to issuers and investors alike.[43] Increases in statutory marginal tax rates for higher income investors would likely induce such an outcome, reducing the attractiveness of BABs relative to traditional tax-exempt bonds.

BABs have been well received by issuers and investors. The Securities Industry Financial Markets Association (SIFMA) reports that through November of 2010, almost $164.1 billion in BABs have been offered in total.[44] **Table 2** shows the issuance of BABs since the first issuance in April 2009 through September 2010, categorized by the use of bond proceeds.

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[39] Data on the distribution of CREBs by state is presented in the **Appendix**.

[40] States that have particularly warm or particularly cool climates may benefit disproportionately from investments in energy efficiency.

[41] 26 U.S.C. 54AA(d)(1)(A). BAB proceeds that use the direct payment options are to be used only for capital expenditures.

[42] U.S. Treasury Department, "Treasury Analysis of Build America Bonds and Issuer Net Borrowing Costs," April 2, 2010.

[43] Researchers have determined that the federal government subsidy for BABs "…disadvantages individual U.S. taxpayers, who are the main holders of municipal bonds, and benefits new entrants in the municipal bond market." New entrants would include international investors and pension funds. See Ang, Andrew, Vineer Bhansali, and Yuhan Xing, "Build America Bonds," *National Bureau of Economic Research, Working Paper 16008*, May 2010.

[44] See http://www.sifma.org/research/statistics.aspx.

Table 2. BAB Issuance: April 2009 through September 2010

millions of dollars

Use of Proceeds	2009 Issuance (Q2 through Q4)	2010 Issuance (Q1 through Q3)	Subtotal by Use: Amount	Subtotal by Use: % of Total
Airports	$717.5	$1,267.2	$1,984.7	1.4
Combined Utilities	233.1	734.7	967.8	0.7
Education	14,758.3	16,604.5	31,362.8	22.9
Electric & Public Power	3,089.0	6,924.5	10,013.5	7.3
Pollution Control	0.0	33.0	33.0	0.0
General Purpose / Public Improvement	22,444.6	22,653.2	45,097.8	32.9
Health Care	1,699.5	1,189.4	2,888.9	2.1
Solid Waste / Resource Management	192.7	116.0	308.7	0.2
Transportation	14,488.0	13,605.1	28,093.1	20.5
Water, Sewer, & Gas Facilities	6,310.2	9,321.3	15,631.5	11.4
Other	211.8	31.8	243.6	0.2
Total	64,144.7	72,480.7	136,902.0	100.0

Source: CRS calculations based on data provided in the SIFMA Fact Sheet, Build American Bonds, available at http://www.sifma.org/research/item.aspx?id=19650.

Notes: No BABs were issued in the first quarter of 2009. Issuances in the fourth quarter of 2010 are not included in this table. "Other" includes issuance to fund projects related to economic development, industrial development, housing, seaports and marine terminals, and nursing homes.

Like tax-exempt bonds, BABs have been used to finance various types of projects. The majority of BAB proceeds are used for general purpose, public improvement, education, or transportation projects. Since their introduction, 7.3% of BAB proceeds have been used to fund electric and public power projects. A very small share of proceeds, less that 0.05%, have been used to finance pollution control facilities. BABs are also used to fund solid waste and resource management as well as water, sewer, and gas facilities. Data on the proportion of BAB-funded projects investing in renewables specifically is not available.

Tax Expenditures

The annual federal revenue loss (or tax expenditure) on the outstanding stock of tax-exempt bonds, CREBs, QECBS, and BABs is reported annually by the Joint Committee on Taxation (JCT). Because the estimates are based upon the outstanding stock of the bonds, it takes time for some legislative changes to show up in these data. The amount of forgone tax revenue from the exclusion of interest income on public-purpose tax-exempt bonds is substantial, thought those used only for energy production is relatively small. For BABs, the JCT does not provide a separate estimate for bonds used in energy production.

Table 3 presents estimated tax expenditures for these bonds and specifically for the exclusion of interest from income for State and local private activity bonds used to finance energy production facilities. Over the FY2009 through FY2013 budget window, tax credits associated with CREBs are expected to reduce federal tax collections by $500 million. Over the same period, the

reduction in federal revenues from QECBs is expected to be approximately $100 million. Allowing interest payments from private activity bonds used to finance energy production facilities to be excluded from income is also expected to reduce federal tax collections by approximately $500 million over the 2009 through 2013 budget window. BABs generally (not just those related to energy) are expected to result in revenue losses of $12.5 billion between 2009 and 2013. As reported in **Table 2**, just over 7% of BABs have been issued for electric power projects. Thus, one could assume that roughly 7% of the tax expenditure for BABs would be for electric power projects.

Table 3. Tax Expenditures

billions of dollars

Tax Expenditure	2009	2010	2011	2012	2013	2009 – 2013
CREBs	[1]	0.1	0.1	0.1	0.2	0.5
QECBs	[1]	[1]	[1]	[1]	0.1	0.1
Exclusion of interest from income for energy facility private activity bonds	0.1	0.1	0.1	0.1	0.1	0.5
Build America Bonds	1.3	2.2	3.0	3.0	3.0	12.5

Source: Joint Committee on Taxation.

Notes: Cells containing [1] have positive tax expenditures of less than $50 million.

Tax-Favored Bonds: Economics Issues

Policymakers can subsidize investment in qualified projects such as renewables by allowing access to tax-favored financing. The amount of the subsidy is determined by the type of tax-incentive (e.g. tax exemption or tax credit) as well as the magnitude of the incentive (i.e. percentage of the tax credit or amount of exemption). Note that tax credits paid to otherwise nontaxable issuers (i.e., state and local governments) would appear as outlays in the federal budget.

Assessing a bond subsidy requires examining the interaction of the net benefits to: (1) issuers, (2) the federal government, and (3) investors. Issuers and federal policymakers would prefer that issuers receive most if not all of the federal subsidy. In most cases, the federal subsidy is intended to assist state and local governments generally or to provide assistance for a specific type of project for policy reasons. BABs were intended as general assistance to state and local governments whereas CREBs were intended to encourage investment in clean renewable energy projects. Tax-exempt bonds were originally afforded their tax-exemption for constitutional reasons, not necessarily the incentive effects.[45] Nevertheless, they do subsidize investment in public capital formation.

Investors, on the other hand, are intent on maximizing after-tax rate of return on bond investments. These investors can be split into two broad groups: taxable investors and nontaxable investors. For taxable investors, tax-exempt bonds are preferred only if the additional yield (higher interest rate) offered by alternative taxable investments, such as BABs and CREBs, does not fully compensate for the taxable interest payment. Investors in marginal tax rates *below* the

[45] When the federal income tax was introduced in 1913, it was asserted that taxation of interest income would be unconstitutional because the exemption was protected by the Tenth Amendment and the doctrine of intergovernmental tax immunity. For more history, see CRS Report RL30638, *Tax-Exempt Bonds: A Description of State and Local Government Debt*, by Steven Maguire.

hypothetical market clearing rate, where the after-tax return of taxable and tax-exempt bonds is equated, would choose taxable bonds. Multiple marginal tax rates for individuals (and to a lesser extent corporations) investing in tax-exempt bonds can create opportunities for windfall gains that are not available for tax credit bonds investors.

Clearly, for nontaxable investors, the a tax-exempt bond is not a wise investment as there is no tax advantage. Taxable bonds, like BABs and CREBs, are more attractive to these investors and marginal tax rates do not influence the federal revenue loss.[46]

Comparison of Tax-Exempt Bonds, CREBs, and BABs

Below is an illustrative example of the variation in subsidy provided by the different types of bonds, highlighting how the subsidy changes across different types of investors. On March 5, 2010, a government owned electricity producer in Georgia, the Municipal Electric Authority of Georgia (MEAG), offered just over $1 billion of Build America Bonds as part of a larger bond issue for an expansion project. The interest rate on the long-term bonds (they mature on April 1, 2057), was set at 6.655%. On March 6, 2010, tax-exempt bonds of similar risk profile were offering an average interest rate of 4.34%. MEAG clearly believed the BAB structure presented the most financially sound option for financing the expansion of their nuclear power generating facility.

Recall that the BAB credit rate is 35%, meaning the federal government will make direct payments to MEAG equal to 35% of the interest cost. In contrast, new CREBs carry a 70% credit rate. The MEAG project would not have been eligible for CREB financing because nuclear energy is not considered a renewable energy source, though the example uses a hypothetical 70% credit for comparative purposes.

Table 4 compares three types of bonds using the parameters of the above MEAG project. The first is a new CREB (with a 70% credit rate), the second is a BAB (with a 35% credit rate), and the third is a traditional tax-exempt bond (TEB). Three hypothetical investors in different tax situations are also compared: (1) a tax free investor (a pension fund or international investor); (2) a 28% bracket investor, and (3) a 35% bracket investor.[47]

Table 4. Comparison of CREBs, BABs, and TEBs

March 2010 BABs for Municipal Electric Authority of Georgia, Project M Bonds

Bond Parameters[a]	
Principal Amount	$1,012,235,000
Taxable Interest Rate	6.655%
Tax-Exempt Interest Rate	4.340%
Implicit Tax Rate	34.786%

	Types of Bonds		
	CREB	BAB	TEB
Interest Rate	6.655%	6.655%	4.340%

[46] CREBs would be attractive to nontaxable investors when the issuing entity claims the tax credit.

[47] Not considered here is the longer term investment decision which would be based not only on this year's tax situation, but future tax considerations. One factor that depresses tax-exempt yields is the advantage is conditional upon having at least some tax liability.

	Bond Parameters[a]		
Credit Rate	70%	35%	0%
Annual Federal Payment[b]	$47,154,967	$23,577,484	-
Annual Issuer Payment	$67,364,239	$67,364,239	$43,930,999
Net Issuer Interest Cost	$20,209,272	$43,786,756	$43,930,999
Net Issuer Interest Cost as %	1.997%	4.326%	4.340%
Investor Taxes (by hypothetical bracket)			
0%	-	-	-
28%	$18,861,987	$18,861,987	-
35%	$23,577,484	$23,577,484	-
Investor After Tax Return			
0%	$67,364,239	$67,364,239	$43,930,999
28%	$48,502,252	$48,502,252	$43,930,999
35%	$43,786,756	$43,786,756	$43,930,999
Investor After Tax Return as %			
0%	6.655%	6.655%	4.340%
28%	4.792%	4.792%	4.340%
35%	4.326%	4.326%	4.340%

Source: CRS calculations based on data provided in the MEAG bond offering statement.

Notes: The estimates included here are meant for comparative purposes and employ assumptions intended to enhance those comparative aspects.

a. Bond parameters are from the bond offering statement accompanying the Municipal Electric Authority of Georgia issuance on March 5, 2010, of Build America Bonds that mature in April 2057. The bonds are for Plant Vogtle Units 3 & 4 Project M. The tax-exempt bond rate is the average rate for bonds that were issued on March 4, 2010, and is from the Federal Reserve Bank, Historical Table H. 15. The implicit tax rate is a CRS calculation that would equate the after-tax rate of return for taxable and tax-exempt bonds.

b. The annual federal payment and the annual issuer payment would be calculated and paid on a quarterly basis.

The annual federal payment to the issuers under the direct payment option would be 35% of the interest rate for BABs and 70% of the interest rate for CREBs. This would generate a $47.2 million payment if the bonds were issued as CREBs and $23.6 million if they were issued as BABs (which they were). The issuer would still make annual payments to investors of $67.4 million under CREBs and BABs. Tax-exempt bonds, in contrast, do not provide for a direct payment to the issuer. The tax-exempt interest rate at the time of this issuance was 4.34%, which would generate a payment to the investor of $43.9 million. Thus, the "after-federal-payment" interest cost for issuers as a percentage of principal would 1.997% for CREBs, 4.326% for BABs, and 4.34% for tax-exempt bonds.

The CREB would generate the largest incentive for the issuer, though this option is not available for nuclear power facilities like the MEAG project. The second best option is the BAB with a lower interest cost than tax-exempt bonds. This simplified example does not take into account other features that would further differentiate bonds issued under the three scenarios including call provisions, sinking fund arrangements, and principal repayment. Also, the relatively late maturity in 2057 makes these bonds somewhat unusual.

The bottom panel of **Table 4** reports the investor's after tax return for the three bonds for three investors in different tax brackets. Importantly, for the investor in the 35% bracket, the TEB has the highest rate of return. For the nontaxable investor and the investor in the 28% bracket, the tax credit bonds are a better investment. The implicit tax rate that equates the rate of return across the bonds is 34.79%, meaning any investor in a tax bracket below that rate would be wise to invest in tax-exempt bonds.[48] The following section provides a more generalized presentation of the economic efficiency and equity questions surrounding tax favored bonds.

Economic Efficiency and Equity Considerations

An economic evaluation of tax-exempt bonds leads to concerns regarding both economic efficiency and equity. Tax-exempt bonds are economically inefficient if the loss in federal revenue exceeds the subsidy provided to issuers. In practice, evidence suggests that tax-exempt bonds are an inefficient subsidization mechanism.[49] Historically, the "implicit tax rate" of tax-exempt bonds has been below the top marginal tax rate.[50] Evidence also suggests that the majority of investors in tax-exempt debt face a marginal tax rate that is greater than the implicit tax rate implied by the difference in returns on tax-exempt and taxable debt.[51] Take, for example, an entity issuing tax-exempt debt at a 25% subsidy (determined by the market through the implicit tax rate). Suppose an investor facing a 33% marginal tax rate purchases this debt. Since this debt is tax-exempt, the federal government does not collect the $0.33 per dollar of interest income it would have collected on taxable interest. The federal government's revenue losses are determined according to investor's marginal tax rates. If the marginal tax rates of investors exceeds the implicit tax rate on tax-exempt bonds (which evidence suggests is the case), tax-exempt debt is an inefficient mechanism for delivering federal subsidy.

Tax-exempt bonds may also generate equity-related concern, as the distribution of the tax benefits for tax-exempt bonds is regressive. Under a tax system with increasing tax rate brackets, the value of holding tax-exempt debt increases as the tax bracket rises. Empirical evidence suggests that eliminating the tax-exemption for state and local debt would increase tax liability primarily for taxpayers in the highest income quintile.[52] Tax data from 2008 indicate that 49% of tax-exempt interest reported on individual tax returns was reported by those with an adjusted gross income of at least $250,000. For comparison, only 2% of individual tax returns filed were in this high-income group.[53]

Tax credit bonds reduce some of the inefficiencies associated with tax-exempt debt while also enhancing equity. Tax credit bonds enhance efficiency by providing an equivalent subsidy to borrowers with less revenue loss, as compared to subsidization using tax-exempt debt. With tax-

[48] Researchers have generally concluded that the market clearing rate is likely in the mid-20% range.

[49] Congressional Budget Office / Joint Committee on Taxation, *Subsidizing Infrastructure Investment with Tax-Preferred Bonds*, October 2009.

[50] The implicit tax rate for tax-exempt bonds is the tax rate that would equalize investor returns on tax-exempt and taxable debt instruments. See James M. Poterba and Arturo Ramirez Verdugo, *Portfolio Substitution and the Revenue Cost of Exempting State and Local Government Interest Payments from Federal Income Tax*, National Bureau of Economic Research, Working Paper 14439, Cambridge, MA, October 2008, http://www.nber.org/papers/w14439.

[51] Ibid.

[52] Congressional Budget Office / Joint Committee on Taxation, *Subsidizing Infrastructure Investment with Tax-Preferred Bonds*, October 2009.

[53] Internal Revenue Service, Statistics of Income (SOI), Table 1. Individual Income Tax Returns, Tax Year 2008 Preliminary Data: Selected Income and Tax Items, by Size of Adjusted Gross Income. Available at http://www.irs.gov/taxstats/indtaxstats/article/0,,id=133414,00.html#_prelim.

credit bonds, the subsidy provided to the borrower through the tax credit is equal in value to the federal revenue loss. Thus, the inefficiency associated with tax-exempt debt, where the loss in revenues to the federal government exceeds the subsidy to borrowers, is eliminated with the use of tax-credit bonds.[54]

Tax credits, generally, are more equitable than tax exemptions. With tax credit bonds where investors receive a tax credit, their reduction in tax liability is on a dollar-for-dollar basis. Thus, the benefits are not greater for those in a higher marginal tax bracket. In the case of tax credit bonds, since the credits are generally taxable for recipients, tax-credit bonds are worth less to higher income taxpayers. In cases where the issuer claims the tax credit, individuals in higher income tax brackets pay more in taxes per dollar of interest payments received.

Other Federally Subsidized Financing

In addition to tax-based renewable energy financing incentives, the Federal government has provided financial support for investments in renewables and energy efficiency using a variety of other policy instruments. In addition to direct spending programs and R&D initiatives, the Federal government subsidizes investment through Federal loan guarantees, direct loan programs, and through the use of matching grants. Examples of such programs are presented below.[55]

Loan Guarantees

Federal loan guarantees can increase investment in markets where project risks inhibit free-market lending. In the case of energy, the risks associated with new technologies may pose a challenge for projects seeking capital. Federal loan guarantees, where the federal government agrees to cover the debt obligation should a borrower default, reduce borrowing costs for participating projects.

ARRA appropriated funds to the DOE for loan guarantee programs. The DOE was initially set to receive $6 billion under ARRA for credit subsidies under the Innovative Technology Loan Guarantee Program. This was later reduced to $2.5 billion.[56] First, $2 billion was diverted to the "cash for clunkers" program in August, 2009 (P.L. 111-47). In August 2010, an additional $1.5 billion from the ARRA appropriation was rescinded from the program to offset spending in the FAA Air Transportation Modernization and Safety Improvement Act (P.L. 111-226).

The DOE's loan guarantee program was first authorized under Section 1703 of EPACT05. When first established, the loan guarantee program was available for projects that 1) avoid, reduce, or sequester air pollutants or emissions of greenhouse gasses, or 2) employ new or significantly improved technologies. Without appropriated funds, projects receiving Section 1703 loan guarantees were required to "self-pay" for subsidy costs and loan administration costs. Under ARRA, Section 1705 was added, which allowed loan guarantees for projects engaged in the rapid deployment of certain renewable and electric transmission projects. The loan guarantee program also received its first appropriation in ARRA, allowing for appropriated funds to cover the credit

[54] For a formal example and further discussion, see Congressional Budget Office / Joint Committee on Taxation, *Subsidizing Infrastructure Investment with Tax-Preferred Bonds*, October 2009.

[55] For a comprehensive list of federal incentive programs for renewables and efficiency, see CRS Report R40913, *Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs*, by Richard J. Campbell, Lynn J. Cunningham, and Beth A. Roberts.

[56] Additional information on the Innovative Technology Loan Guarantee Program, including a list of projects receiving loan guarantees, is available through the DOE at http://www.energy.gov/recovery/lgprogram.htm.

subsidy for Section 1705 projects. Loan guarantees for projects qualifying for the credit subsidy must be made by September 30, 2011.[57]

Direct Federal Loans and Matching Grants

The Federal government has also provided direct loans to support advanced technologies. For example, the Advanced Technology Vehicle Manufacturing Program (ATVM) supports advanced technologies in the automotive industry. The program was established by the Energy Independence and Security Act of 2007 (EISA; P.L. 110-140). The FY2009 Continuing Resolution (P.L. 110-329), enacted on September 8, 2008, appropriated $7.5 billion to support the ATVM loan program.

Federal matching grant programs encourage investment by providing federal funds to match non-federal investments. The Smart Grid Investment Matching Grant Program, for example, provided up to 50% in matching federal grants for investments in smart grid technologies.[58] The Smart Grid Investment Matching Grant program was established under EISA but did not receive funding prior to the passage of ARRA. Winners of these grants were announced in October 2009.[59]

On-Bill Financing and PACE Programs

On-bill financing programs seek to overcome barriers to energy efficiency and renewables investments by tying the costs of improvements to consumer's utility bills. Specifically, allowing consumers to pay for energy efficiency improvements using utility bills savings overcomes the high first-cost hurdle often thought to impede investments in energy-efficiency. While generally administered as the State and local level, the Federal government has supported on-bill financing programs by providing seed money, interest rate buy-downs, or covering administrative expenses. Under ARRA, $3.2 billion was provided to the Energy Efficiency and Conservation Block Grant (EECBG) program and $3.1 billion to the State Energy Program (SEP).[60] While EECBG and SEP these funds can be used for a variety of state and local energy-efficiency programs, some of these funds were used to promote on-bill financing programs.

In early 2010, property assessed clean energy (PACE) financing programs emerged as a mechanism for diverting capital to fund residential energy-efficiency improvements. State and local governments established PACE programs to provide loans for energy-efficiency improvements. Under the PACE model, the issuing entity floats bonds to provide the initial capital for the program. The proceeds are then used to make loans to individuals or businesses investing in energy-efficiency improvements. The loans are added to property tax bills through special assessments and are paid off over time. The PACE model was modeled after land-secured municipal finance projects. With these projects, the public benefits are repaid through special

[57] By the end of 2010, the DOE's loan guarantee program had supported nearly $25 billion in loans. See the Department of Energy's Loan Programs Office website, available at http://lpo.energy.gov/.

[58] Adding to the value of this incentive, the IRS has ruled that grants received under the Smart Grid Investment Matching Grant Program are not to be included in taxable income. See IRS Revenue Procedure 2010-20.

[59] The Department of Energy has published a list of winners, available at http://www.energy.gov/recovery/smartgrid_maps/SGIGSelections_State.pdf.

[60] More information on these programs is available through the Department of Energy, at http://www1.eere.energy.gov/wip/eecbg.html and http://www1.eere.energy.gov/wip/sep.html.

assessments secured by the property.[61] Ideally, the energy savings realized from installing energy-efficient property will compensate for increased property tax bills.

In the PACE model, the special assessments are senior liens on the property. As a senior lien, the loans pose less risk, reducing the interest rates required by investors. The lower interest rate required by the bondholders, the lower the interest rate homeowners participating in PACE programs are required to pay.

Objections to the senior lien status of PACE loans, however, has effectively stopped PACE programs. In July 2010, FHFA released a statement directing Fannie Mae, Freddie Mac, and the Federal Home Loan Banks to tighten lending standards in PACE districts.[62] FHFA objected to the senior lien status of PACE loans, noting that PACE programs present "significant safety and soundness concerns" and have the potential to "disrupt fragile housing finance markets."[63] One option for PACE programs would be to subordinate PACE assessments. Doing so would, however, increase risks leading investors to demand higher rates of return, and in turn increase borrowing costs for those borrowing to make energy efficiency improvements.[64]

Policy Options

In addition to the programs discussed above, there are other policy options for federally supported renewable energy financing. Examples of such options are briefly discussed below. As noted in this report, financing many existing tax-favored or otherwise federally favored financing programs does not currently exist. For example, CREB financing is not currently an option for tax-exempt entities considering undertaking a renewable energy investment.[65] BABs were no longer available as of December 31, 2010. Policymakers looking to encourage investment in renewables and efficiency may begin to start by looking at existing programs and deciding which, if any, programs should be extended and funded in the future.

Green Banks and Green Bonds

Congress has been, and is expected to continue exploring policies designed to attract private capital to the renewable energy sector. In 2009, Representative Chris Van Hollen proposed legislation that would establish a "Green Bank."[66] This bank would provide low-cost financing for qualifying renewable energy projects. The bank would be capitalized through an issuance of "green bonds."

[61] Public projects can include infrastructure projects, such as streetlights, roadways, or water facilities; public buildings, such as schools or libraries; or recreational facilities, such as public parks.

[62] Federal Housing Finance Agency, "FHFA Statement on Certain Energy Retrofit Loan Programs," press release, July 6, 2010, http://www.fhfa.gov/webfiles/15884/PACESTMT7610.pdf.

[63] Ibid.

[64] Additional information on the status of PACE programs is available from the Department of Energy, at http://www1.eere.energy.gov/wip/pace.html.

[65] CREBs were established to be a counterpart to the production tax credit (PTC) available for taxable entities producing energy using renewable resources. One argument for providing additional CREB funding is that the PTC remains available for taxable entities, while tax-exempt investors do not have a comparable incentive. While tax-exempt investors do not have a comparable incentive, such entities do benefit from generally their tax-exempt status.

[66] To establish the Green Bank to assist in the financing of qualified clean energy projects and qualified energy efficiency projects (H.R. 1698).

Under the Van Hollen proposal, "green bonds" would be issued by the U.S. Treasury. The idea is that themed bonds attract investors that want to be involved in achieving a specific societal objective. The World Bank has issued green bonds and used the proceeds to support projects expected to have a positive impact on climate change.[67]

Concluding Remarks

Tax favored financing is one of many policy options for encouraging investment in renewables and energy-efficiency technologies. In markets that may fail to consider the full costs associated with fossil energy sources, renewables may be disadvantaged. One option to promote renewables that has been considered by Congress is a renewable portfolio standard (RPS). Requiring that some level of electricity be produced using renewable resources would drive markets to invest more in renewables and may lead to energy efficiency investments. In the absence of such market drivers, tax-subsidized financing is another option for promoting investment in the renewable sector. Further, the use of tax-credit bonds addresses some of the economic efficiency and equity concerns that have been raised with respect to the use of tax-exempt bonds in the past.

The goal of tax favored financing is to reduce the cost of borrowing for those investing in renewables and efficiency, making it easier for such projects to attract investors. While federally subsidized financing may attract investment, there is also the possibility that investment would have taken place without subsidization. In this case, tax favored bonds may reduce a project's borrowing costs, rewarding bond issuers at taxpayer expense without creating additional renewable energy capacity. Energy tax subsidies reduce federal revenues, an issue that is of growing concern in an era of high budget deficits.

Well designed tax favored financing options should strive to achieve technology neutrality. Oftentimes, in practice, tax favored investment opportunities are given to specific types of technologies. When policymakers select the types of technologies eligible for various forms of subsidized financing, there is a danger of "picking winners." Subsidizing one technology may lead to additional investments in the subsidized technology, at the expense of non-subsidized, but potentially promising alternatives.

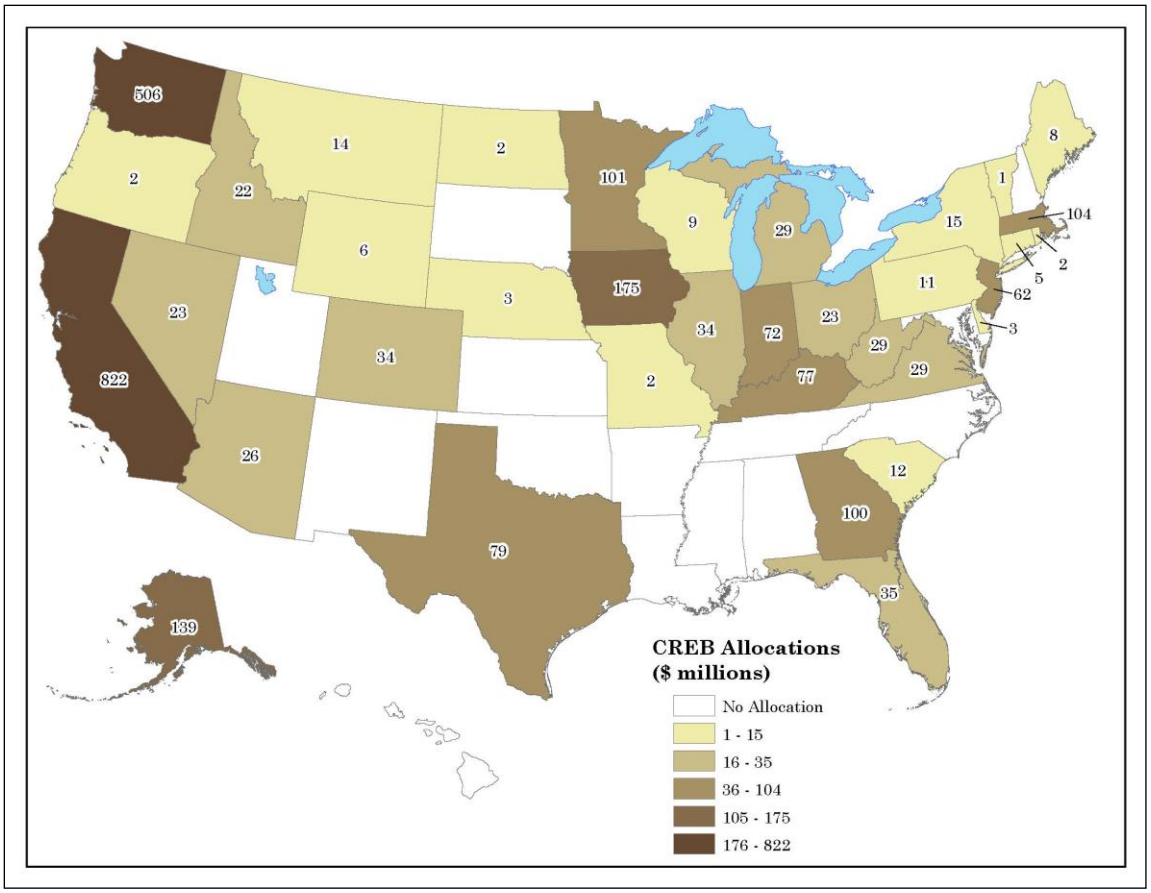
[67] Heike Reichelt, "Green Bonds: A Model to Mobilise Private Capital to Fund Climate Change Mitigation and Adaptation Projects," in *The Euromoney Environmental Finance Handbook* (2010), http://treasury.worldbank.org/web/Euromoney_2010_Handbook_Environmental_Finance.pdf.

Appendix. CREBs by State

Figure A-1 illustrates the distribution of the 2007 and 2009 CREB allocations by state. California received the largest allocation, receiving $822 million. A number of states did not receive any CREB allocations. As noted above, CREBs are not awarded to states based on population as is the cast for other types of tax credit bonds. While this may prevent some states from receiving CREB allocations, it may also result in a more efficient allocation of CREB financing, as financing is more likely to be concentrated in states better suited for CREB-eligible projects.

Figure A-1. CREB Allocations by State

2007 and 2009

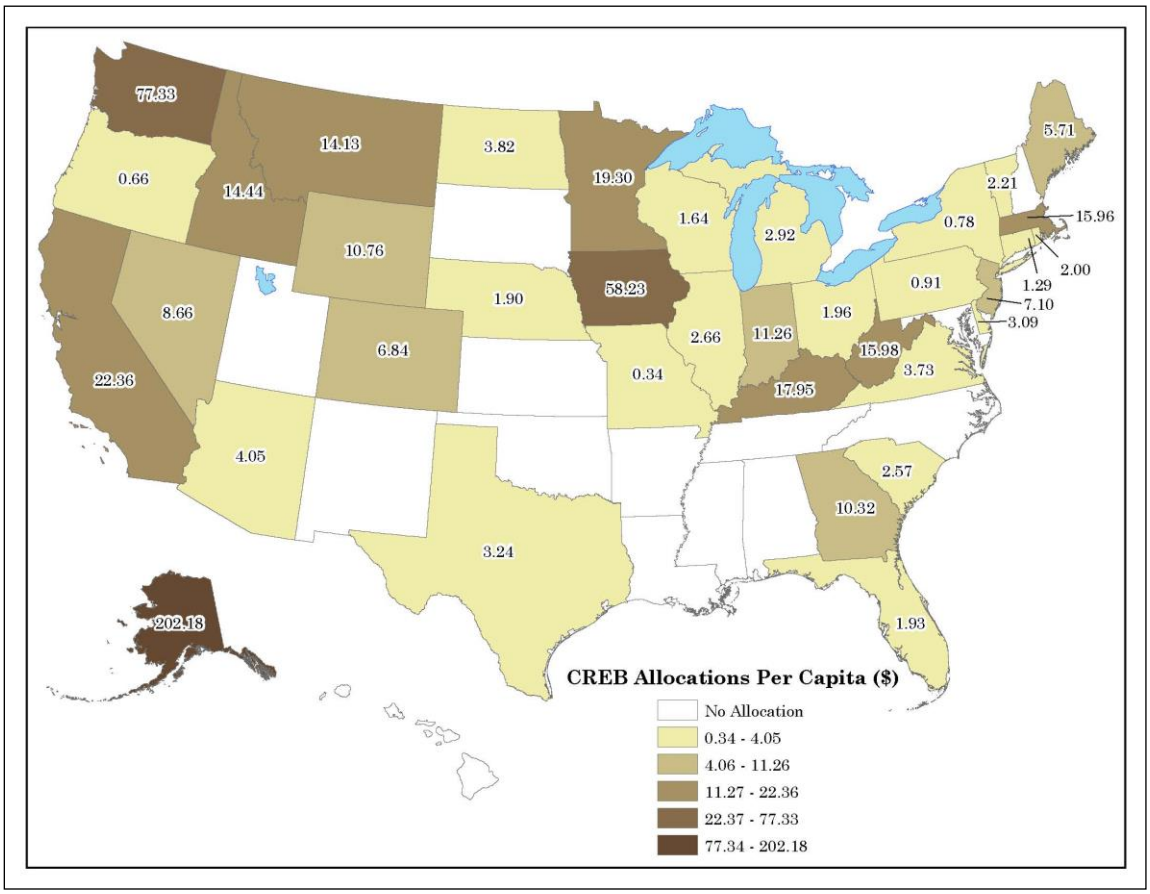


Source: CRS graphic produced using Internal Revenue Service data.

Figure A-2 illustrates 2007 and 2009 CREB allocations per capita. While California received the largest allocation of CREBs in absolute terms, Alaska received the largest allocation ($202) on a per capita basis. Washington state also received a large per-capita allocation ($77).

Figure A-2. CREB Allocations per Capita

2007 and 2009



Source: CRS graphic produced using Internal Revenue Service data. Population data is from the U.S. Census.

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